Microdata

M-6000
COMPUTER SYSTEM

Installation and Planning Guide

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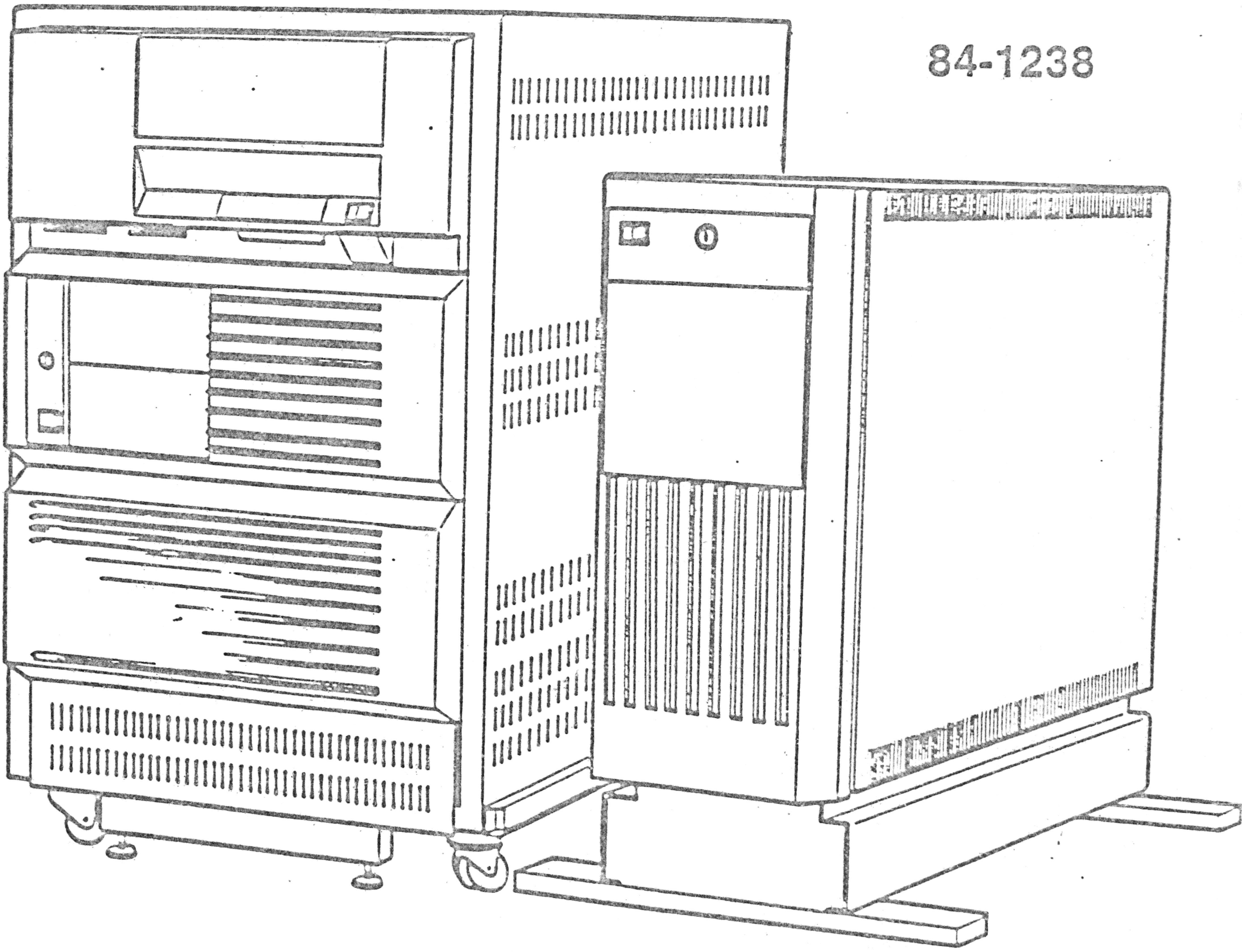


PRELIMINARY

SECTION 1

INTRODUCTION

The Microdata M6000 Computer System is designed for ease and simplicity of installation. Everything practical has been incorporated to make installation as straightforward as possible.

Planning a computer installation is extremely important. It is not a complex engineering task, nor is it a cursory procedure to be treated lightly. Most installations only require attention to the requirements of the system as a whole and the relationship of the system to the particular facilities and operations.

Proper planning and site preparation before the equipment arrives will insure the speediest installation, maximum long-term operation and smooth economical expansion to meet growth requirements. A well planned and prepared installation site will circumvent costly post-delivery system modifications or facility changes, and will avoid extended periods of system inoperation in extreme cases.

SCOPE

purpose of this Installation and Planning Guide is to assist the customer in the planning and selection of the computer site, prepare this location for correct power and environment, and provide a list of equipment specifications for reference and future expansion plans.

Selection of Site Coordinator

A site coordinator should be selected who will interface between Microdata representatives, facilities personnel, contractors, or any consultants necessary to carry out the installation objectives in a timely manner.

The site coordinator will be responsible for scheduling any construction work necessary and act as the principal interface with Microdata representatives. Microdata personnel will be available for consultation throughout the planning, site preparation, delivery and installation of the M6000 Computer System.

The following topics will be outlined in detail:

- Site planning and selection
- Environmental requirements

SECTION 2

SITE PLANNING AND SELECTION

Installation sites for M6000 Computer Systems may vary from large rooms to spacious, beautifully decorated computer centers which double as showcases for the benefit of customers and employees. Sites may be open and readily accessible, or may have restricted access for security reasons. The complete system may be centralized in one large room, or data terminals can reach out to extend the system throughout the building, across town or across the country.

Whatever the scope of your system, the major area of concern during the site planning stage is the central computer site which must house the M6000 Computer, Tape Storage Units, Data Printer, and one or more M6000 Data Terminals.

Topics covered in this section are:

- Site layout
- Location
- Environment
- Security
- Data terminal location

SITE LAYOUT

The size of the central computer site depends on five primary criteria:

1. System size
2. Expansion
3. Personnel
4. Storage
5. Environmental equipment

System Size

The room or area must be large enough to accommodate the M6000 equipment with certain minimum clearances for operation and maintenance.

LOCATION

physical location of the central M6000 Computer will most ely be determined by two main factors; proximity of the site to u ng departments, and availability of suitable space. The first of these factors often is of secondary importance since the M6000 Data Terminals (through which most communication with the system takes place) can be conveniently and economically located just about anywhere they are needed.

Generally, it is advisable to situate the offices of programmers, operators, and other personnel who require direct physical access to the central system close to the central site. It is highly desirable to locate the central site where all of the peripheral data terminals can be connected directly to the computer without using telephone lines or modems.

Normally, it is possible to select the central computer site from presently available space with a minimum of facility modifications required. Certain costs should be expected to prepare the site for installation of the M6000 System. For example, electrical wiring modifications may be necessary, air conditioning may be needed, or room partitions may be used to separate the computer from adjacent work areas. The nature and extent of these preparations will depend on the present conditions of the site, the specific M6000 System configuration, and the requirements for decoration, security, etc.

ronment

All equipment in the M6000 System is designed to operate in a controlled atmosphere of temperature, humidity, and dust. Proper evaluation of the site can identify environmental deficiencies which may exist in some localized area of your facility. Such an evaluation will point out cost tradeoffs which may have a bearing on final site selection.

Security

Internal design and programming of the M6000 System maximizes security of data stored within the system. Although M6000 Data Terminals may be located anywhere, data is safeguarded by special user passwords. In addition, data access and/or alteration can be controlled through the use of retrieval/update lockout security codes in the file management software. These codes may be applied to entire files or to selected portions of the data records.

To further protect confidential or sensitive information, it may be desirable to restrict physical access to the central system since it is conceivable for an unauthorized person possessing the knowledge to operate the CPU controls to obtain any information in the system or tamper with the data files. Maximum security can be achieved by ing the central system behind locked doors. Backup programs data files should be duplicated and stored at a separate cation under lock and key.

Expansion

protect the long range economy of your system, provisions should be made to accommodate foreseeable future expansion at the central computer site. Additional electrical power and floor space may be required for equipment added or upgraded at a later time. Providing for future expansion during initial system installation can help avoid costly modifications and disruption of operations later.

Personnel

Additional floor space may be required for personnel activities in the immediate area. For example, operators, programmers or clerks may require desks, tables, or filing cabinets adjacent to the computer system.

Storage

Storage requirements will vary on individual applications, however, as a minimum, storage should be provided for the following items:

- Magnetic tapes
- Printer paper forms (bulk) and ribbons
- Operator and/or technical manuals
- Work tables
- Equipment cleaning supplies
- Trash container

Magnetic tapes, and technical and operator manuals supplied with the system should be available to operating personnel. Combustible materials such as cleaning solvents should be stored in fire resistant containers in accordance with the National Fire Protection Association standards.

To minimize storage space requirements around the computer, bulk items may be stored in a remote location.

Environmental Equipment

Ideally, air conditioning and other environmental control equipment should be located outside the computer site to minimize the acoustical noise level and to reduce the possibility of electrical interference. If an air conditioner, humidifier/dehumidifier or air purifying equipment is to be installed in the computer site, be in to allow adequate space for proper operation and servicing the unit (e.g., filter replacements, etc.).

DATA TERMINAL LOCATION

M6000 Data Terminals can be located just about anywhere within the facility. The terminals are compact and may be mounted on desk or table top in about the same space as an electric typewriter, making the terminals suitable for use in labs, manufacturing areas, etc.

The maximum cable length for direct connection is 174 feet when using the RS-232C interface at 9600 baud (using the LCC option). Longer lengths may be possible with this interface but the integrity of data cannot be guaranteed, and therefore NOT recommended. Refer to Appendix A for approved part numbers and associated connector information when installing communication cables. Maximum cable lengths for other baud rates are as follows:

Table 1. Baud Rates And Cable Lengths.

BAUD RATE	LENGTH (FEET)
1200	1392
2400	636
4800	348
9600	174
~~19200 (Multi-Drop)~~	~~87~~

SECTION 3

ENVIRONMENTAL CONTROLS

Environmental factors of temperature, humidity, and airborne dust in prospective installation sites should be evaluated during the planning stages and controlled prior to the M6000 installation.

Topics covered in this section are:

- Temperature
- Humidity
- Dust
- Static electricity
- Smoking

TEMPERATURE

Recommended Range:

65° F to 75° F (18° C to 24° C)

Temperature control is probably the most important environmental factor because the M6000 equipment is cooled by surrounding room air. The temperature in office buildings and most other likely installation sites is nearly always controlled to within allowable limits for the M6000 equipment. Nevertheless, a number of factors should be considered to determine the adequacy of existing temperature controls.

Heat Dissipated By The M6000 Equipment

All electrical equipment generates heat. In the M6000 System, this heat is discharged into the room and will tend to raise the ambient temperature unless the air conditioning system can handle it. (BTU ratings for all M6000 equipment are provided on specification sheets in the back of this guide.)

Heat Dissipated By Other Equipment

Heat will also be contributed by other equipment in the room (e.g. electric typewriters, lights, and auxiliary data processing (pment). Calculate 3.41 BTU per watt of electrical power sipated.

Body Heat

ividuals occupying the room will contribute approximately 400 s per person. This can be an important consideration if substantially more people will occupy the area after the computer is installed.

Direct Sunlight

A window or glass wall provides virtually no insulation against radiant energy from direct sunlight. Drapes, shades, or venetian blinds should be employed to protect the M6000 equipment from direct sunlight, since this can raise the equipment temperature excessively without exceeding the allowable ambient air temperature. If a large glass area cannot be shaded, one of the commercially available glass tinting films that block heat producing infrared rays is recommended.

If there is any question concerning the adequacy of your present temperature control system, a reputable air conditioning specialist should be consulted. He can use the above information to determine the suitability of the present system, and can recommend corrective measures.

DITY

Recommended relative humidity range

40% to 60% (non-condensing)

High and low extremes of humidity can make paper documents and printer output paper hard to handle and can impair proper operation M6000 equipment, particularly the Disk and Tape Storage Units.

Low humidity levels can have the most serious effect on system operation and are more frequently encountered than excessively high humidity. Low humidity promotes static electricity buildup in the electronic equipment. Proper equipment grounding minimizes this effect but will not eliminate it completely. The rapidly rotating Magnetic Disk and moving Magnetic Tape are particularly susceptible to static buildup. Such static can destroy data stored on the magnetic medium. Static charge buildup is further increased if the system is installed in a carpeted area. Carpeting is discussed in the site layout and preparation section of this guide, and equipment grounding is covered in the electrical requirements section.
High humidity extremes tend to prevent smooth travel of the Magnetic Tape.

air conditioners are rated for their ability to remove moisture ell as their ability to cool. In extremely humid environments ch inadequate humidity controls, it may be desirable to install a dehumidifying unit in the computer room. In very dry environments (such as desert areas) a humidifier may be necessary to add moisture to the air. Once again the effectiveness of humidifying controls be best evaluated by a qualified air conditioning specialist.

DUST

Airborne dust or dirt particles can cause equipment operation or maintenance problems. If a film of dust or dirt accumulates on internal surfaces, excessive wear of mechanical parts may occur and electronic components may become shorted (particularly with high humidity). Disk and Tape Storage Units are especially vulnerable to damage from excessive dust. Heating, air conditioning and ventilating systems should be equipped with adequate air filters. These filters should be cleaned or replaced at regular intervals to insure proper temperature control as well as dust filtering.

STATIC ELECTRICITY

Static electricity is not only an annoyance to personnel but can cause equipment malfunction. It is important to minimize or eliminate the sources of static generating equipment.

Chairs, seats, or couches having plastic upholstery and rubber ls should be prohibited in the computer system area. Furniture of this type builds up and stores a static charge created by the friction of clothing moving over the plastic. The rubber wheels prevent bleedoff through the floor covering. The discharge of this buildup to computer equipment may cause system malfunction when personnel or the furniture contact the system framework. Static problems can be minimized by:

- Selecting chairs with antistatic upholstery and metal wheels to avoid static buildup.
- Maintaining the room's relative humidity above 40%.
- Replacing carpeting with conductive floor tile covering around the computer bays
- Using chemical sprays to eliminate static on carpeting and furniture located near the computer equipment.

SMOKING

Smoking of cigarettes, cigars, or pipes should be prohibited within the vicinity of the central system. The Magnetic Tape Transports particularly susceptible to smoke film buildup which can cause ruption of data and equipment damage.

SECTION 4

ELECTRICAL REQUIREMENTS

Topics covered in this section are:

- Power requirements
- Power failure
- Electrical noise
- Circuit breakers
- Extension cords
- Grounding

POWER REQUIREMENTS

Voltage 115VAC

Frequency 60Hz

Microdata M6000 Systems sold for use in the United States operate most cases from 115VAC, 60Hz single phase power.

The particular configuration of the M6000 System determines the number of cabinets that the system will have. Each cabinet comes equipped with a 12 foot AC line cord with a twist lock plug (NEMA L5-30P) attached to it.

Corresponding wall socket(s) capable of delivering 30Amps to each abinet must be provided.

Wall socket required:

NEMA L5-30R IG (30Amp twist and lock).
(Isolated Ground Receptacle)

Two cabinets will be the maximum physical configuration, and two wall sockets must be located within 1 foot of each other, centrally behind the system.

AC power at the wall sockets must be capable of supplying 30 Amps between 100 and 125VAC, 59.5 and 60.5Hz. Further, it must not fluctuate more than 2 percent from no-load to full load conditions and be free from line disturbances.

parate branch circuit for the M6000 Central Processor Unit uld be installed using one of the following methods.

1. Metal-clad cable (BX), type AC Article 334*

2. Rigid metal conduit	Article 346*
3. EMT thin-wall conduit	Article 348*
4. Flexible method conduit	Article 350*

> NOTE:
>
> The circuit for this equipment MUST NOT be run through conduit with other electrical circuits but should be a separate and isolated conduit run which passes from the AC receptacle(s) directly to the circuit breaker. See Appendix B.

Power supplied from any U.S. utility company should meet the foregoing requirements. If power at the outlet is deficient, the wiring between the outlet and the power lines is likely inadequate or the problem may be an old or faulty circuit breaker causing an excessive voltage drop. In any case, the power company or a qualified electrician should be consulted to examine the wiring and recommend corrective measures.

All elements of the M6000 System (CPU, Tape, and Disk Storage s) interconnect within the main cabinet. They derive their power 115 volt convenience outlets inside the cabinet.

The printer(s) and terminals have separate three-wire power cables, which plug into standard 120 Volt receptacles.

In addition, certain requirements may necessitate modifications to existing power wiring or the installation of new power lines to the computer site.

Data terminal and printer power

120 VAC 60Hz
Wall Socket
NEMA 5-15R IG (ISOLATED GROUND)

* Article number in the National Electrical Code Book

POWER FAILURE

When the system is in the RUN or TEST Mode, it will shut down automatically with no damage to the system hardware when a power re occurs. The system will automatically restart and resume ration. The Disk Units may require several minutes delay after ver restoration before they are operational. The Magnetic Tape

Unit and Data Printer(s) may require manual attention to reload the e or reposition the paper.

ELECTRICAL NOISE

Another factor which may require the attention of an electrician is electrical noise and impulses on the AC power lines. Electrical equipment such as air conditioners, copy machines, and typewriters can generate noise transients which may be fed back on the AC power lines. For this reason it is mandatory that a dedicated power line be used for the M6000 Central Processor System.

NOTE:

Air conditioners generate a large amount of electrical interference on the AC power lines. These disturbances can interfere with the operation of the M6000 System unless steps are taken to isolate the power disturbances from the power lines serving the computer equipment. Electrical noise can sometimes be eliminated by repair, replacement, relocation, or electrical filtering of the originating device. If not, a suitable power line conditioner may have to be installed in the AC line to the M6000 System by a qualified electrician.

CIRCUIT BREAKERS

The central system equipment must be on a separate line protected by a circuit breaker rated at 30 Amperes. This breaker will permit continuous system operation, and will tolerate the short-term startup current surges without tripping.

POWER CABLE

The M6000 equipment must be situated close enough to the power outlet so that the 12 foot power cable supplied with the system will suffice without the use of an extension cord. The National Electrical Code (N.E.C.) will not allow flexible cords in excess of 12 feet on equipment.

SECTION 5

EMI REQUIREMENTS

M6000 Systems have been designed, manufactured, and tested to comply with the electro-magnetic interference (EMI) limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules. It is the user's responsibility to ensure that the system remains within these acceptable limits during operation. This can be accomplished if the equipment is installed and maintained by Microdata Field Service personnel or any other service organization authorized by Microdata.

The following guidelines are provided to assist the user in maintaining the M6000 System within FCC specifications in the event that authorized service is either unavailable or declined.

1. The most important factor in maintaining the M6000 System within FCC specifications is keeping all system doors and filler panels closed and firmly secured with their respective locking devices. A system with an open or missing door will drastically exceed EMI limits and may seriously interfere with radio frequency communications within the local area.

   All the hardware (screws, nuts, locking latches, etc.) should be checked and tightened periodically. Especially the following:

   - All screws securing I/O connectors to I/O panel.
   - All screws securing I/O connectors to terminals, printer, etc.
   - All screws securing cable connectors to printers.
   - All hardware on I/O panel should be checked and tightened periodically.

3. Be certain that there are no open holes on the I/O panel. All holes should be filled with I/O connector assemblies or blank filler plates.

4. IF I/O (TERMINAL/PRINTER) CABLES OR CONNECTORS OTHER THAN THOSE SOLD BY MICRODATA ARE TO BE USED, THEY SHOULD BE ORDERED FROM ONE OF THE VENDORS LISTED IN APPENDIX A.

5. Connection of foreign equipment (equipment not supplied by Microdata) to the M6000 System will very likely cause unacceptable EMI performance. This includes other vendor equipment that, although complying with Subpart J of Part 15 of FCC Rules, when combined with the M6000 System may exceed EMI limits (e.g., both pieces of equipment are at the high

SECTION 6

SITE LAYOUT AND PREPARATION

The previous sections of this guide presented the factors to be considered in selecting a site for the M6000 System. Once a site has been chosen, the layout of equipment and furniture must be planned and the site must be prepared. If more than one site is under consideration, this section will provide additional insight to allow a final decision to be made.

Topics covered in this section include:

- Layout of equipment and furniture
- Cabling
- Telephone/data lines
- Carpeting
- Fire prevention

ut of your M6000 computer site demands careful planning. Once computer equipment is installed and interconnected, reposition- g is more involved than simply moving a desk or a typewriter.

LAYOUT OF EQUIPMENT AND FURNITURE

Locations of equipment and furniture should be based on the operational requirements of the M6000 System and the efficiency, comfort, and convenience of personnel using the room. Because individual pieces of equipment are interconnected by cables of limited length, and because of space limitations and the need for maintaining certain clearances for access, servicing, and work space, several tentative layouts may be considered before selecting the most suitable.

A site layout worksheet and a page of line drawings representing the individual M6000 System elements complete with minimum clearances and work space requirements will be found in the rear of this section. A scale of 1/4 inch = 1 foot is used for both the worksheet and equipment drawings.

To plan the layout, photocopy both the worksheet and the page o quipment drawings. Measure the computer site and draw it to e on the worksheet. Cut out the photocopied equipment drawings and position them on the worksheet, pasting them in place when a desired layout is found. Desks, filing cabinets and other furniture can be drawn on the worksheet using the 1/4 inch = 1 foot scale. Repeat the procedure for layout variations and alternate installation sites.

Separate cutout drawings are provided for the M6000 Data Terminals, and peripheral equipment.

Note that work areas and cabling/airflow/maintenance clearances are identified on the equipment drawings. Work areas shown are considered to be the minimum required for comfortable, efficient operation of the system. Space permitting, these work areas may be larger than indicated, but under no circumstances should they be smaller or overlap one another.

CPU cabinet access is via the front and the rear. At least 24 inches is required behind the CPU cabinet for access and removal of circuit boards, proper air flow, and communication cable exits.

Another important consideration during site layout is the location and angular position of the M6000 Data Terminals with respect to light source. Office desks and all other M6000 equipment should receive sufficiently high light levels to permit reading, writing, and operation and servicing of the system. Optimum use of the data terminals may require a somewhat lower light level for easy reading of the CRT display. If the CRT screen or the operator face a high intensity light source or unshaded window, the screen will be difficult to read. All terminals should be positioned at oblique angles to windows and any major light source. Ideally, the area should be somewhat darkened with lighting controls that can be adjusted by the operator.

CABLING

Normally, M6000 System elements are ordered with interface cables for connection to the CPU. The length of the interface cable limits the distance between each piece of equipment and the CPU. For purposes of site layout, power cables and signal interface cable lengths are summarized in the Equipment Specifications Section of this manual.

It should be noted, however, that I/O cabling is a very important factor in assuring compliance with FCC regulations. It is strongly recommended that if Microdata cable is not used that one of the vendors listed in Appendix A be used.

TELEPHONE/DATA LINES

It is advisable to have all telephones and telephone lines installed prior to the installation of the M6000 equipment.

CARPETING

is advisable to have the M6000 System installed on floors or raised floors with good antistatic tile properties. If carpeting is unavoidable around the computer units, be sure to select a carpet with antistatic characteristics. This type contains embedded wires to prevent static buildup and is commercially available.

FIRE PREVENTION

Fire prevention measures should be reviewed and implemented before installation of the M6000 System to protect the capital investment, the safety of employees, and to satisfy the requirements of the insurance carrier and local fire department. An insurance agent is perhaps the best source of information on this subject. He should be thoroughly familiar with all applicable regulations and can offer advice on any insurance premium savings made possible by improved fire prevention measures.

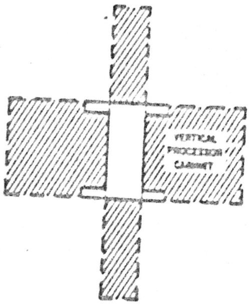
Insurance or local regulations may require an overhead sprinkler system or installation of an appropriately rated fire extinguisher in the M6000 site. However, keep in mind that other fire suppression systems are available using pressurized gasses (halon).

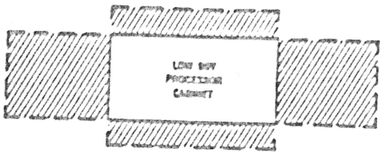
ation should also be given to protecting magnetic tapes and paper output forms. A duplicate backup copy should always be stored remotely from the site in a separate fire resistant container.

SECTION 7

EQUIPMENT SPECIFICATIONS

The following pages provide equipment specifications for the M6000 System and peripheral equipments.


VERTICAL
PROCESSOR
CABINET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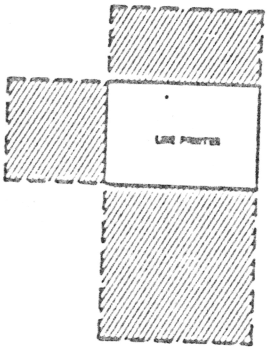
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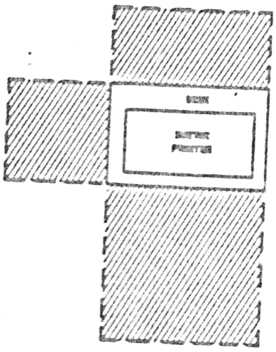
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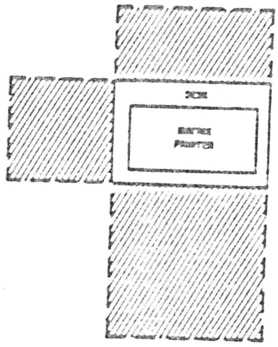
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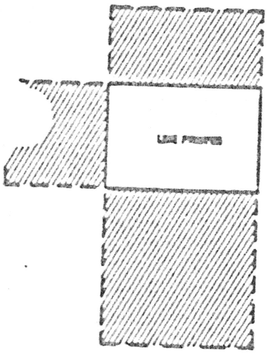
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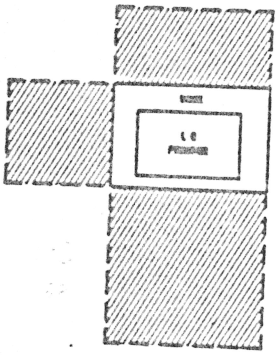
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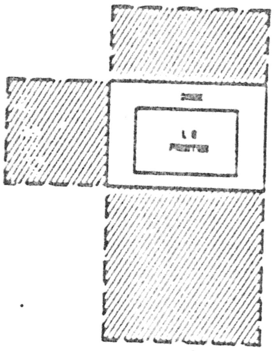
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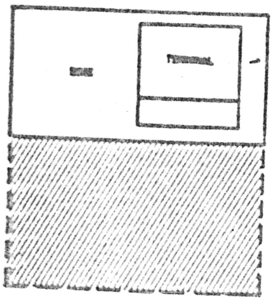
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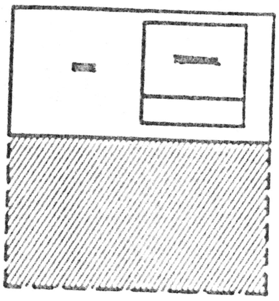
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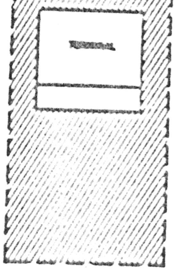
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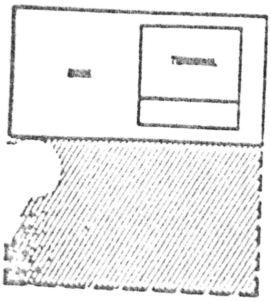
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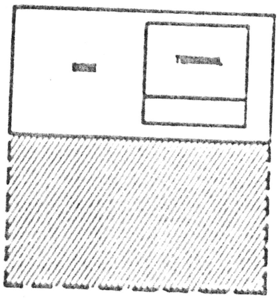
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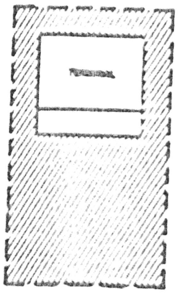
TERMINAL

Dimensions

Width	16.38 in.	416 mm	
Depth	25.59 in.	650 mm	(withdrawals 25 inches-to-front)
Height	9.84 in.	250 mm	

Weight

Heat Dissipitation

100 lbs. 45 Kg

Power Requirements

Frequency	60Hz + 2% - 4%
Voltage	120VAC + 8% -14%
Phases	single
Current	3.5Amp (normal run)
Starting surge (for 9 sec.)	10Amps

Wall Receptical

Uses Cabinet Power (120VAC)

Operating Environment

Temperature (in cabinet)	41°F to 104°F (5°C to 40°C)
Inlet air temp.	41°F to 85°F (5°C to 30°C)
Humidity	20% - 80% relative (no condensation)

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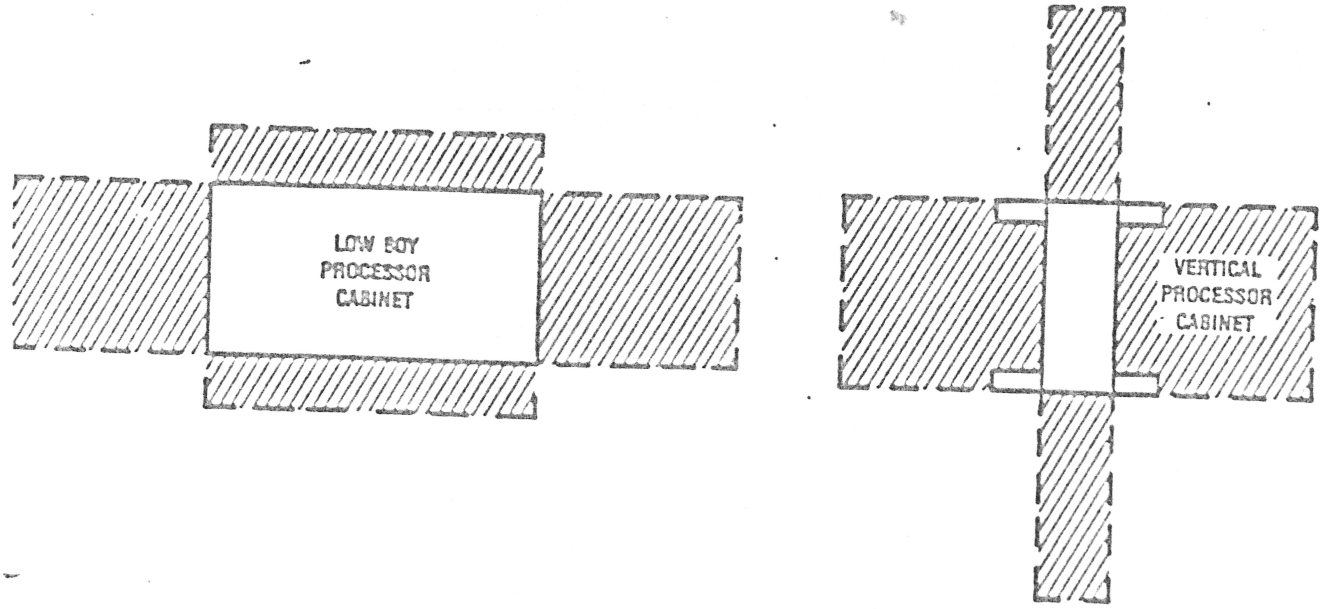


M6000 CENTRAL PROCESSOR CABINET

EQUIPMENT LAYOUT

MAGNETIC TAPE STORAGE UNIT

photo

GENERAL

The standard M6000 Tape Drive is a self-loading, Single (1600) or dual density (1600/3200), reel to reel, Streaming Tape Drive. Tape speeds and transfer rates are as follows:

	25 IPS	50 IPS	100 IPS
1600 BPI	40,000 Char/Sec		160,000 Char/Sec
3200 BPI		160,000 Char/Sec	

The Tape Drive will operate in start-stop or streaming mode at all three tape speeds.

Dimensions

Width	17.0 in (43.2 cm)
Depth	24.5 in (62.2 cm) From Mounting Surface
Height	8.75 in (22.2 cm)

Weight

80 lbs (36.0 Kg)

it Dissipation

750 BTU/H

LOCAL CLUSTER CONTROLLER

GENERAL

The Local Cluster Controller converts the multidrop RS-422 line from the M6000 Unit to 4 RS-232C Ports. The LCC's can be used with each LCC. The individual Baud Rate is software selectable. The Baud Rate is kept in a non-volitile memory backup on the LCC unit. The LCC has its own Internal Micro Diagnostics.

Dimensions

Width	11.06 in.
Depth	9.50 in.
Height	3.00 in.

Weight	5 lbs.
Height Disipation	300 BTU's lm

Power Requirements

Frequency	60Hz ± 1Hz
Voltage	120VAC ± 10 %

PRISM 4 DISPLAY TERMINAL

GENERAL

PRISM 4 is a microprocessor-based high speed interactive CRT display terminal. The display module provides a green phosphorus screen display with a 20 tilt angle and a 60 swivel. The display, together with the movable keyboard, provides maximum operator comfort.

Dimensions	Logic & Video Module	Keyboard
Width	18.75 in (48 cm)	19.0 in (48 Cm)
Depth	14.0 in (36 cm)	7.75 in (20 Cm)
Height	15.5 in (39 cm)	2.75 in (7 Cm)

Weight

32 lbs (14.5 Kg)

Heat Dissipation

512 BTU/H

er Requirements

Frequency	60Hz ± 1Hz
Voltage	120VAC ± 10%

Phase	Single
Current	1Amps

Receptacle

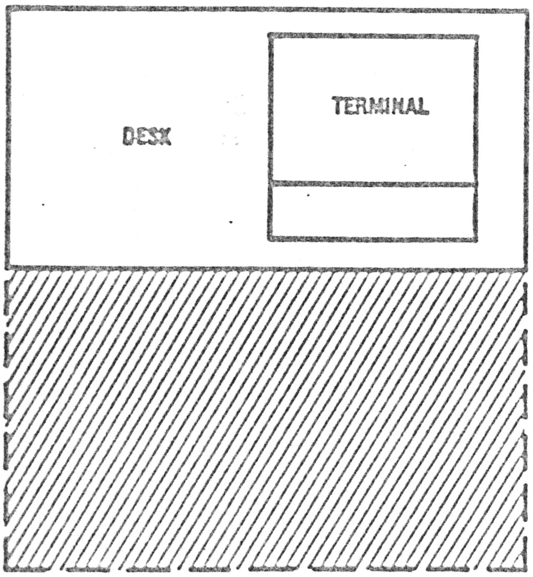
IG NEMA 5-15R (Isolated ground receptacle)

Operating Environment

Temperature	Recommended	65°F to 75°F (18°C to 24°C)
Humidity	Recommended	40% to 60% (Non-condensing)

Cable Length

Power	7 feet
Interface	(See Appendix A and Table 1 on page 2-4)



PRISM 4 DISPLAY TERMINAL EQUIPMENT LAYOUT

LINE PRINTER

GENERAL

The M6000 family of line printers are pedestal mounted dot matrix impact printers with 132 print columns. They are available with parallel interface in 300 and 600 LPM models, each with graphic printing capabilities. The 300 LPM model are also available with optional serial interface for operation remotely from the ~~SPIRIT~~ System.
M6000

Dimensions

Width	30 in (76 cm)
Depth	25 in (64 cm)
Height	17 in (43 cm) (41 inches including stand)

Weight

176 lbs (80 Kg)

Heat Dissipation	300 LPM	600 LPM
Nominal BTU/H	1638	1706
Maximum BTU/H	2628	3481

Power Requirements

		300 LPM	600 LPM
Frequency		60Hz	60Hz ± 1Hz
Voltage		120Vac	120VAC ± 10 %
Phases		Single	Single
Current	(Nominal)	4.0Amps	4.2Amps
	(Max)	6.4Amps	8.5Amps

Wall Receptable (1) NEMA IG5-15R

NOTE: (600 LPM requires a dedicated 20Amp circuit)

Operating Environment

Temperature	Recommended	65°F to 75°F (18° to 24°C)
Humidity	Recommended	40% to 60% (non-condensing)

Cable Lengths

Power	7 feet
Parallel Interface	20 feet
Serial Interface	(See Appendix A and Table 1 on Page 2-4)

s Specifications

Microdata's Line Printers are capable of printing one to six copies on 15 lb. (56 g/m) to 100 lb. (376 g/m) weight stock. The printer prints on continuous, fanfolded, edge-perforated forms up to 16 inches (40.6 cm) wide. Maximum thickness at any point on the form shall not exceed .025 inches (0.0635 cm). The maximum left and right margins measured from the first and last print positions shall be 1.75 inches and 1.125 inches respectively.

The use of compression binding on multi-part forms is strongly discouraged as this method of binding often causes high spots that exceed the maximum allowable forms thickness. A staggered glue binding on both margins is the most successful method for binding multi-part forms.

Throughput Specifications

Although rated at 300 and 600 LPM, the actual throughput will depend on several factors inlcuding the number of printers in simultaneous use, system loading, etc. In addition, 300 LPM printer operating in the serial mode will have throughput determined by the I/O transmission (baud) rate. The maximum transmission rate is dependent on the cable length (see Appendix A and Table 1 on page as well as the aformentioned criteria.

LETTER QUALITY PRINTER

GENERAL

Microdata's Letter Quality Printer is a microprocessor controlled, bidirectional printer with interchangeable type fonts. When used with Microdata's WORDMATE word processing software, the printer outputs reports, letters, memos, and other documents requiring superior print quality. Print speed is 33 characters per second.

Dimensions

Width	21.6 in (55 cm)
Depth	14.6 in (37 cm)
Height	8.7 in (22 cm)

Weight

37.5 lbs (16.9 Kg)

Dissipation

580 BTU/H

Power Requirements

Frequency	60Hz ± .5Hz
Voltage	120VAC ± 10%
Phase	Single
Current	2.5Amps

Wall Receptacle

IG NEMA 5-15R (Isolated Ground Receptacle)

Operating Environment

Temperature	Recommended	65°F to 75°F (18°C to 24°C)
Humidity	Recommended	40% to 60% (non-condensing)

Cable Length

Power	7 feet
Interface	(See Appendix A and Table 1 on page 2-4)

LETTER QUALITY PRINTER EQUIPMENT LAYOUT

MATRIX PRINTERS

GENERAL

The Microdata 538x family of Matrix Printers are available in several models with print speeds ranging from 180CPS to 400CPS. The printers are each designed to handle a broad variety of applications; some providing a near letter quality print mode for combining data and word processing capabilities on the same printer.

Dimensions

Width	25.0 in (63.5 cm)
Depth	16.1 in (40.9 cm)
Height	6.3 in (16.0 cm)

Weight

32.2 lbs (14.6 kg)

[illegible] Dissipation

426 BTU/H

Power Requirements

Frequency	48-65Hz
Voltage	120VAC ± 10%
Phase	Single
Current	2.0Amps

Wall Receptacle

IG NEMA 5-15R (Isolated Ground Receptacle)

Operating Environment

Temperature	Recommended	65° F to 75° F (18° C to 24° C)
Humidity	Recommended	40% to 60% (non-condensing)

Cable Length

Power	7 feet
Interface	(See Appendix A and Table 1 on page 2-4)

Forms Specifications

printers are designed to use marginally punched (sprocket fed) fold paper. Multi-part forms should be free of staples or stitching and preferably held together with fugitive gluing or self-crimping techniques and be of uniform thickness from side-to-side. It is always best to consult your forms supplier for help in selecting the best forms construction and to try a sample to insure satisfactory operation. If the forms will also be used in a icrodata line printer, self-crimping or compression bindings should not be employed.

The most satisfactory performance from the printers can be achieved with the weight of paper shown in the following table:

Table 2. Recommended Paper Weights.

NUMBER OF PARTS	RECOMMENDED PAPER WEIGHT	WEIGHT OF CARBON INSERT SHEET
1	15 lb (56g/m)	
2, 3 or 4	3.4 lb (50g/m)	8 lb (19g/m)
5 or 6	12 lb (45g/m)	8 lb (19g/m)
Recommended maximum weight for single ply paper is 24 lb (90g/m). Maximum forms thickness must not exceed 0.025 in.		

MATRIX TERMINAL

GENERAL

The Microdata Model 5350 Matrix Terminal provides printing output coupled with interactive keyboard input in a single unit. The Model 5350 is typically used where a single telephone line provides both input and hardcopy output to a remote site. The 5350 is also useful wherever a hardcopy log of terminal activity is desired.

Dimensions

Width	22.0 in (55.9 cm)
Depth	18.5 in (47 cm)
Height	5.5 in (14 cm)

Weight

23 lbs (10.45 Kg)

F Dissipation

256 BTU/H

Power Requirements

Frequency	48-65Hz
Voltage	120VAC ± 10%
Phase	Single
Current	1.5Amps

Wall Receptacle

IG NEMA 5-15R (Isolated Ground Receptacle)

Operating Environment

Temperature	Recommended	65° F to 75° F (18° C to 24° C)
Humidity	Recommended	40% to 60% (non-condensing)

Cable Length

Power	7 feet
Interface	(See Appendix A and Table 1 on page 2-4)

Forms Specifications

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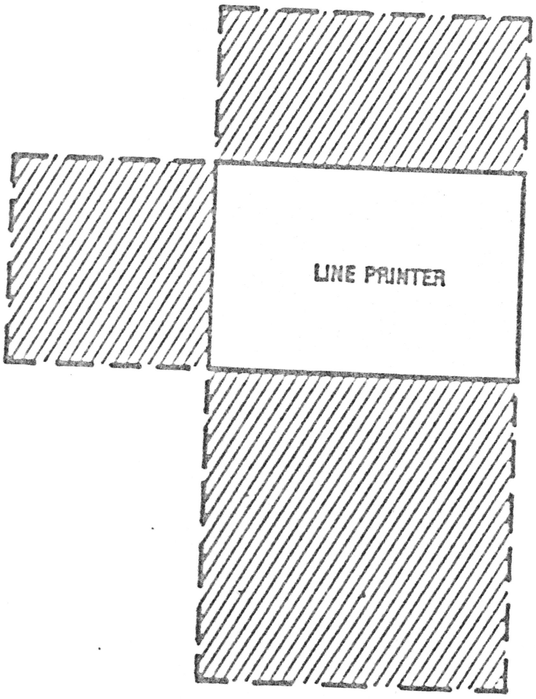

LINE PRINTER

HIGH SPEED LINE PRINTER EQUIPMENT LAYOUT

SECTION 8

RECEIVING THE M6000 SYSTEM

The M6000 System is packaged for shipping in a moderately rugged container. The container will protect the system against most hazards associated with transporting computer equipment.

INDICATORS

In addition to the ruggedized shipping container, the outer carton bears six special instruments. Two of the instruments are called TIP-N-TELL and will indicate if the system has been tipped and if so, the degree to which it has been tilted. The other four indicators are call SHOCK WATCH and indicate whether or not the system has been subjected to undue shock (rough handling, dropping, etc.).

The following illustrations demonstrate how the indicators should appear under normal conditions and how they will appear if they have been activated.

UNACTIVATED
TIP-N-TELL INDICATOR

UNACTIVATED
SHOCKWATCH INDICATOR

ACTIVATED
TIP-N-TELL INDICATOR

ACTIVATED
SHOCKWATCH INDICATOR

PTING FOR SYSTEM

Since Microdata personnel normally will not be on site when the system is delivered, it is very important that the individual receiving the system (person who signs the carrier's freight document) check the six indicators. Any activated indicators should be clearly noted on the freight document before signing. In addition, any other outward signs of damage should be noted on the freight document. This will expedite processing of insurance claims should it be necessary.

Once the system has been inspected and accepted, notify Microdata to arrange for installation.

Heat Dissipation

Standby	1515 BTU/H
Printing	3904 BTU/H

Power Requirements

Frequency	47 to 63Hz
Voltage	120VAC (+10% -15%) Dedicated
Phase	Single
Current	11Amps
Plug Type	NEMA L5-20P
Receptacle	NEMA L5-20R

Operating Environment

Temperature	Recommended 68° F to 75° F (21° C to 24° C)
Humidity	* 20% to 80% non-condensing

* With static eliminator

Cable Lengths

Power	12 feet
Interface	20 or 40 feet

Paper Specifications

Type	Standard fanfolded, edge-punched
Width	3.5 to 18.75 inches overall
Length	3.0 to 14.0 inches
Thickness	0.02 inches maximum
Single copy	15 lb minimum, 18 to 20 lb recommended
Multi-copy	12 lb typical with 6 to 8 lb single-shot carbon for up to six parts
Card Stock	15 to 125 lb

Ribbon Specification

3 mil nylon ribbon - Data Products P/N 239385-003

APPENDIX A

TERMINAL CABLE INTERFACE SPECIFICATIONS

The following cable assemblies are available for connecting Microdata's standard terminals to M6000. One 9-pin connector interfaces to the LCC communication panel while the other 25-pin connector interfaces to the terminals. All cable assemblies are RS-232C compatible.

Microdata cable assemblies:

Assy. Part No.	Mktg Model No.	Lengths (feet)
A20032287-001	7-5963-02	25
A20032287-002	-05	50
A20032287-004	-10	100 (note)
A20032287-005	-20	200 (note)

NOTE:

This cable assembly comes in a kit; connectors are not attached.

e cable assembly has 4 twisted pairs, and is double shielded to protect against electrical, or electromagnetic interferences.

For customers wishing to route their own terminal cables, bulk cable connector components may be purchased from the following dors.

BULK CABLE. (4 twisted pair double shielded 24 AWG)

Part Number	Vendor	City	Phone No.
CS20032098	MICRODATA		
CS20032098	C & M	Wauregan, CN	203 774-4812
CS20032098	Brand Rex	Santa Ana, CA	714 835-0802
CS20032098	Storm Products Co.	Inglewood, CA	213 776-8141
CS20032098	Blake Wire & Cable	Torrance, CA	213 515-0561
CS20032098	Mohawk	Boston, MA	617 537-9961

9-PIN D CONNECTOR PLUG

Part Number	Vendor	City	Phone No.
SP53000325	MICRODATA		
DE9P	Cannon	Available Locally	
DE9P	TRW Cinch	" "	
DE9P	SOURIAU	" "	
MD9M20000	Positronix	Rogersville, MO	800 641-4054

N CONNECTOR HOOD ASSY (Metal Shell)

Part Number	Vendor	City	Phone No.
SP52210154	MICRODATA		
DE110963-1	Cannon	Available Locally	
745171-5	Amp	" "	

ERRULE FOR 9 PIN SHELL

Part Number	Vendor	City	Phone No.
SP53100150	MICRODATA		
745508-6	AMP	Available Locally	

25-PIN CONNECTOR PLUG

Part Number	Vendor	City	Phone No.
SP53000115	MICRODATA		
DB-25P	Cinch	Available Locally	
DB-25P-K75	Cannon	" "	
DB-25P	Souriau	" "	
CDB25P	C.D. Corp.	" "	

25-PIN CONNECTOR HOOD (Metal Shell)

Part Number	Vendor	City	Phone No.
SP53000356	MICRODATA		
745173-4	AMP	Available Locally	

FERRULE FOR 25 PIN SHELL

Part Number	Vendor	City	Phone No.
SP53100151	MICRODATA		
745508-5	AMP	Available Locally	

> NOTE:
>
> Complete FCC compliant cable connector kits (excluding cables) are available from MICRODATA under the following marketing part number:

FCC Connector Kit - 5902

P num Communication Cable Requirements.

eral states have adopted building codes that do not allow PVC (Polyvinylchloride) outer jacketed cables to be used through air plenums. CS20032098 specifies PVC jackets.

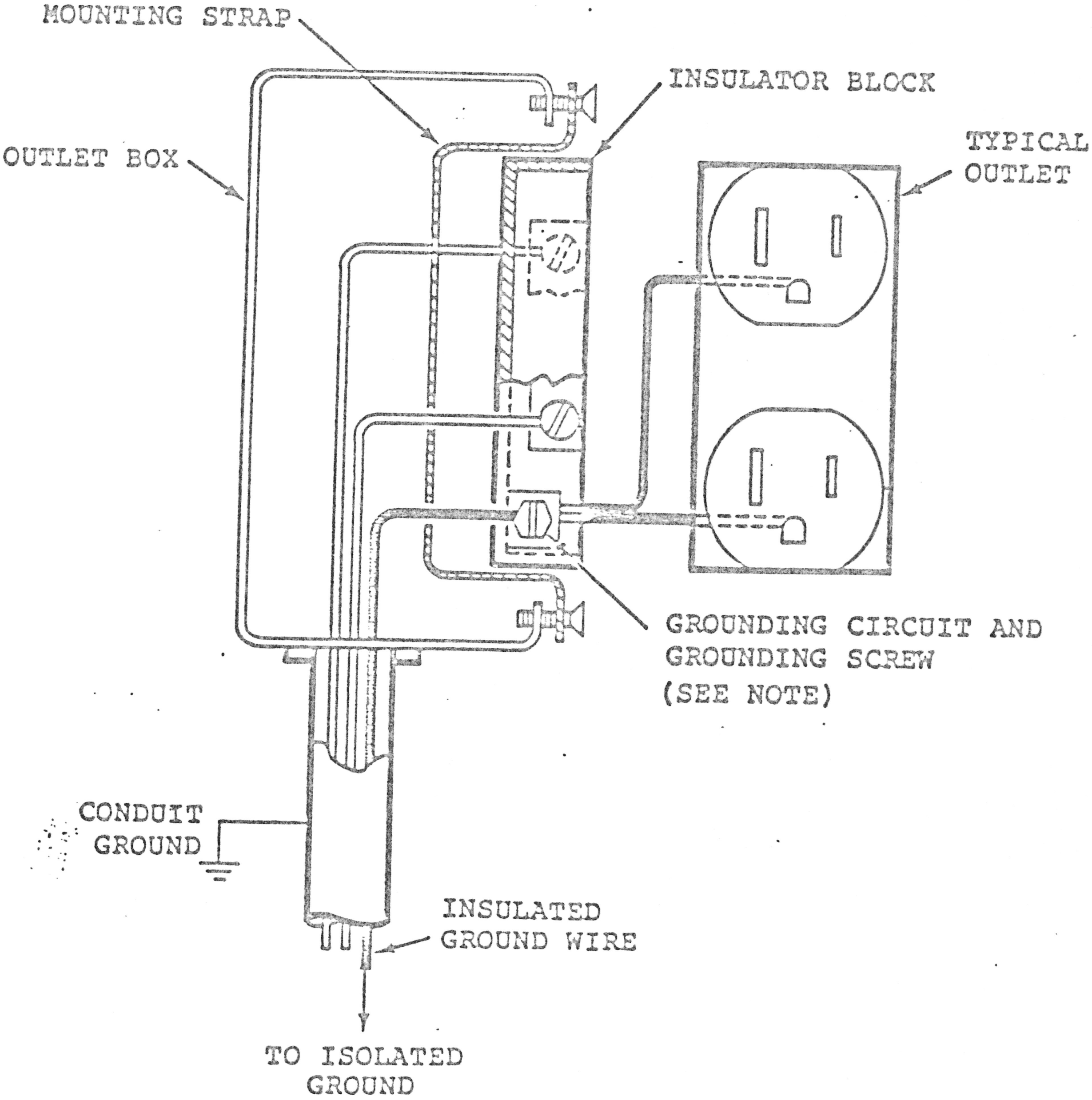
The alternatives are to install the cables through conduit, or to replace them with equivalent Teflon* jacketed design. This material meets the UL and NEC codes regarding low flame spread and low smoke emmission standards (NEC 725 Class 2).

* The following vendors supply "Teflon" jacketed cables per Microdata's specification CS20032298:

Phalo Wire and Cable	Boston, MA	617 844-4021
Mohawk	Boston, MA	617 537-9961
Berk Tek	Reading, PA	215 376-8071
Storm Products	Inglewood, CA	213 776-8141

APPENDIX B

TYPICAL ISOLATED GROUND RECEPTACLE


MOUNTING STRAP
OUTLET BOX
INSULATOR BLOCK
TYPICAL OUTLET
GROUNDING CIRCUIT AND GROUNDING SCREW (SEE NOTE)
CONDUIT GROUND
INSULATED GROUND WIRE
TO ISOLATED GROUND

NOTE: SOME MANUFACTURERS PROVIDE A PIGTAIL LEAD RATHER THAN A GROUND POST FOR ISOLATED GROUND. BE SURE TO INSULATE CONNECTION IF PIGTAIL TYPE IS USED.

APPENDIX C

TYPICAL M6000 ELECTRICAL DISTRIBUTION SYSTEM

1. A separate, dedicated, isolted 3-Wire circuit for each processor. Each 20Amp, and 30Amp circuit consist of the following: A 120VAC, 60Hz single phase, three wire, grounded circuit capable of handling 20Amps, and 30Amps respectively. AC power at the outlet will be 120VAC with less than 2% fluctuation between load and no-load conditions. The proper IG (Isolated ground) receptacle must be used with each circuit.

2. The 600 LPM printer and the BP1500 printer both require a 20Amp circuit. Although the 600 LPM printer uses a 15Amp rated connector and receptacle.

3. All circuits will be protected at the computer sub-panel with th appropriate rating circuit breakers.

4. Each 30Amp circuit will be wired with a minimum of #10 AWG copper wire, with the circuit having a maximum of 100 ft. Those circuits exceeding 100 feet will be required to increase the wire guage size by one size for each additional 100 feet.

5. One of the following methods must be used for installation of each circuit.

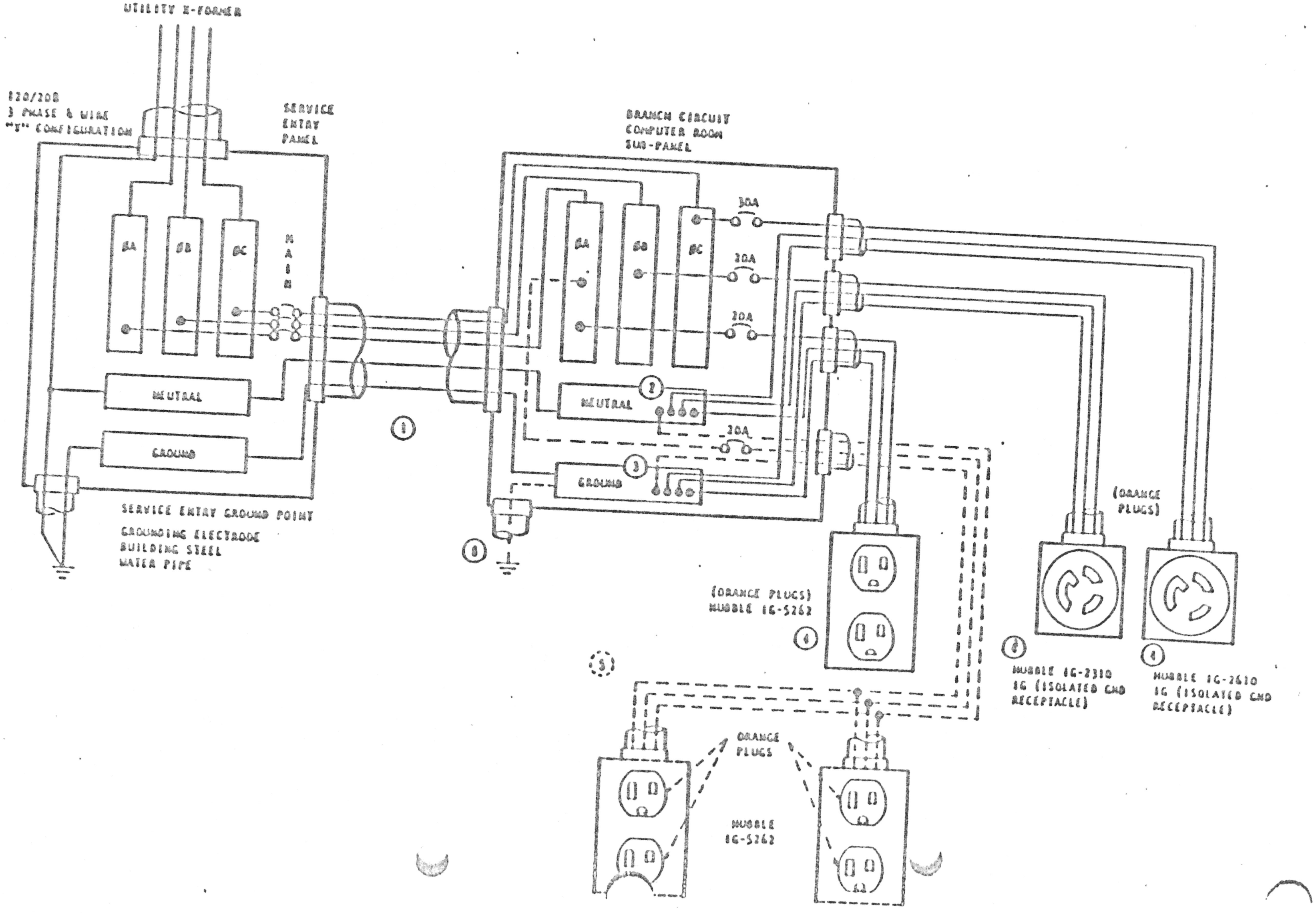
a. Metal clad cable (BX) type AC	*(Article 334)
b. Rigid metal conduit	*(Article 346)
c. EMT Thin Wall Conduit	*(Article 348)
d. Flexible Metal Conduit	*(Article 350)

*Refers to the Article number in the National Electrical Code Book.

NOTE:

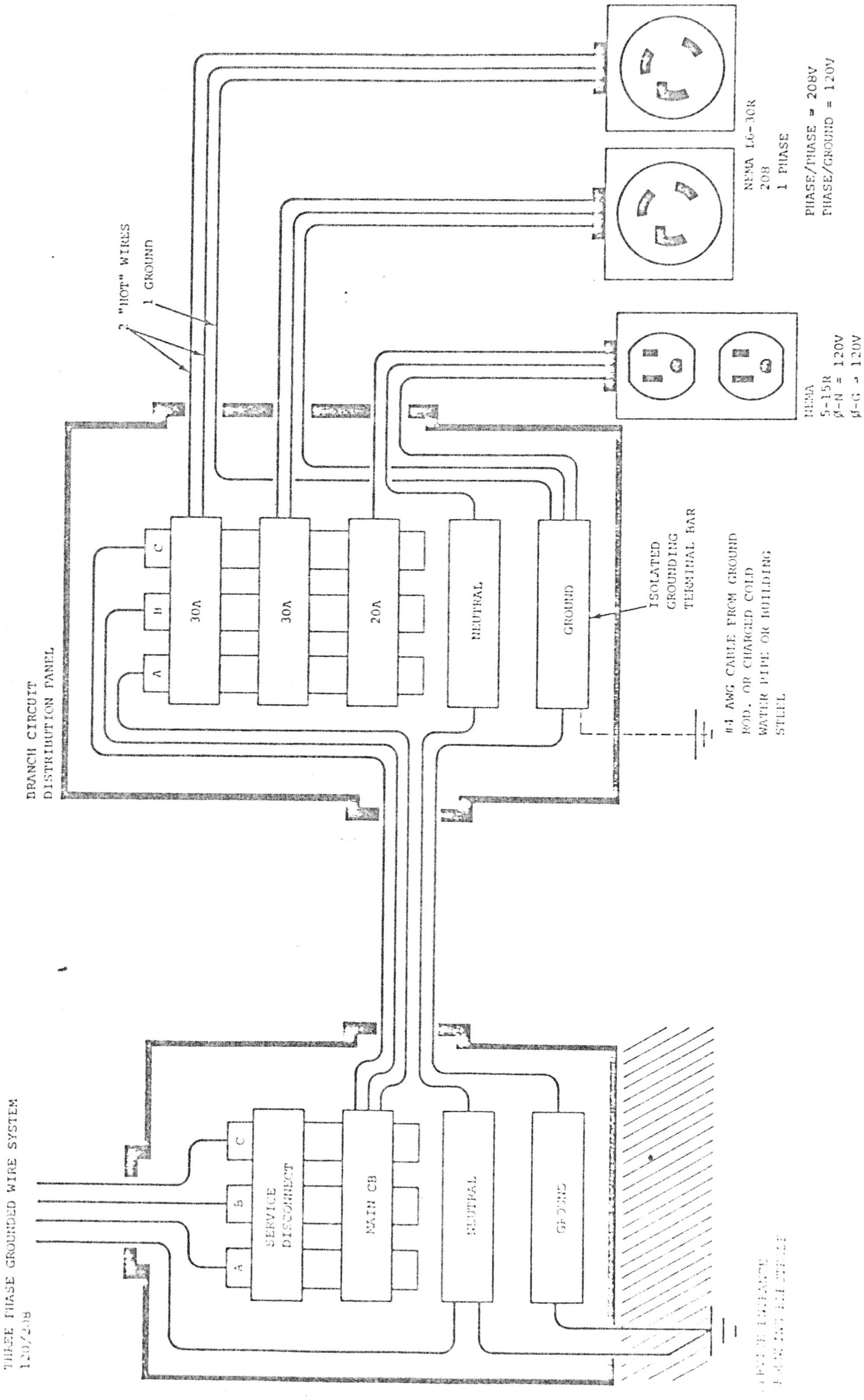
Each circuit for the equipment must not be run through conduit with other electrical circuits. It must be a SEPARATE, ISOLATED and DEDICATED conduit run which passes from the AC receptacle directly to the circuit breaker.

TYPICAL M6000
ELECTRICAL DISTRIBUTION
SYSTEM PROPERLY GROUNDED


UTILITY X-FORMER
120/208
3 PHASE 4 WIRE
"Y" CONFIGURATION
SERVICE
ENTRY
PANEL
ØA
ØB
ØC
M
A
I
N
NEUTRAL
GROUND
SERVICE ENTRY GROUND POINT
GROUNDING ELECTRODE
BUILDING STEEL
WATER PIPE
①
BRANCH CIRCUIT
COMPUTER ROOM
SUB-PANEL
ØA
ØB
ØC
30A
20A
20A
20A
NEUTRAL
②
GROUND
③
⑥
(ORANGE PLUGS)
HUBBLE IG-5262
④
(ORANGE
PLUGS)
④
HUBBLE IG-2310
IG (ISOLATED GND
RECEPTACLE)
④
HUBBLE IG-2610
IG (ISOLATED GND
RECEPTACLE)
⑤
ORANGE
PLUGS
HUBBLE
IG-5262

APPENDIX C

TYPICAL SEQUEL POWER DISTRIBUTION SYSTEM PROPERLY GROUNDED


NEMA L6-30R
208
1 PHASE
PHASE/PHASE = 208V
PHASE/GROUND = 120V
NEMA
5-15R
Ø-N = 120V
Ø-G = 120V
2 "HOT" WIRES
1 GROUND
BRANCH CIRCUIT
DISTRIBUTION PANEL
A
B
C
30A
30A
20A
NEUTRAL
GROUND
ISOLATED
GROUNDING
TERMINAL BAR
#4 AWG CABLE FROM GROUND
ROD. OR CHARGED COLD
WATER PIPE OR BUILDING
STEEL
THREE PHASE GROUNDED WIRE SYSTEM
120/208
SERVICE
DISCONNECT
MAIN CB
NEUTRAL
GROUND